



TECHNOLOGY OF FAST CONSTRUCTION OF HOUSING AND INDUSTRIAL BUILDINGS FROM OPTIMIZED SANDWICH PANELS

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Abstract

The article focuses on the technological process of residential and industrial buildings construction built from industrial sandwich panels, which is proposed to be used in Uzbekistan. At the same time, the construction process provides for a reduction in costs and labor costs. The article describes the development of non-standard innovative technologies, the designing skills, manufacturing devices in local conditions, practical installation processes, technological solutions, developments, scientific research and recommendations in the construction of industrial buildings built at a mobile and accelerated pace.

Keywords. Mounting technology, sandwich panels, technological process, model, labor force, car time, algorithm, mobile and accelerated assembly systems, non-traditional montage.

Introduction

In recent years, with a simplified method of assembling "dry" industrial sandwiches, we can see new approaches in the development of innovative technologies in the combined residential and industrial buildings construction. The research object is the technological process of individual residential buildings construction as well as industrial buildings by the installation method of industrial sandwich panels. The technological process allows for faster installation than traditional capital structures based on stone building materials - brick, concrete, reinforced concrete and others.





The research subject is the development of technological processes parameters for the construction of residential and industrial buildings through the installation of industrial sandwich panels. The goal is to reduce labor costs and construction costs in Uzbekistan. [1].

The rapid development of industrial production in our country requires an increase in the demand for capital funds, buildings and structures, and fast and quick solution to this problem. This raises the developing, improving and implementing issue not only traditional materials and technologies, but also new, innovative, non-traditional, alternative technologies for industrial and production buildings. Examples include fast-moving and mobile assembly systems, such as plaster slab materials or sandwich panel prefabricated wall and ceiling systems. [5].

The main problems inherent in traditional capital construction and especially in the construction of industrial buildings and structures are the heavy industry in their construction, long-term, requiring a large amount of manpower and resources, the pressure from these devices on the building foundation with a load on the floor, is associated with the complex problems solution in ensuring the seismicity problem. [1].

The proposed mobile integrated systems provide a complete and comprehensive solution to the above problems and have the following advantages: they are light; is assembled at a rapid pace, the assembly process is simple; the nodes solution is simple; possibility to restore any planned and volumetric dimensions, almost complete factory production, costs minimization associated with finishing operations, no need for heavy-duty lifting equipment in the assembly technology, complete mechanization of the assembly process, assembly of knots in the supporting elements, high temperature it should be noted that welding or thermochemical measures have been abandoned. [6].

Methods and Techniques

By comparing the technological process used in the construction of industrial buildings, it is possible to propose an optimal solution based on foreign experience, technological design in accordance with the conditions of Uzbekistan, analysis of technical and economic systems, theoretical modeling, and technological parameters of building construction. Here the comparison of the technological process is carried out step by step. [2].





The first stage involves the theoretical model development of increasing the production efficiency of construction operations in order to optimize the walls assembling process of the building on the basis of sandwich panels. This model is offered not only during the construction stages, but also as a structural set of high-tech solutions obtained during subsequent assembly, demolition, i.e. operation, repair, dismantling and relocation processes. (1) [2].

$$M = f(\text{BHSB}) + (\text{YKTY}) \rightarrow \text{max}, (1)$$

here M is a model for improving the production of construction processes,

BHSB - stages of the life cycle in a building,

YKTY - stages of development and implementation of new constructive and technological solutions. [3].

Such basic technological parameters of building construction, labor and machine time costs, the work cost and duration are recommended to be assessed not only during the system preparation and maintenance, design and construction phases, but also as a whole sum of system costs. The above-mentioned savings can be achieved if the installation work is carried out on the basis of a single procedure and with a specially developed schedule, i.e, one can save money and construction time. Theoretical foundations of rational technological solutions for the construction of residential and industrial buildings from industrial sandwich panels are developed (figure 1). It is possible to propose a new algorithm for the optimal model development of construction and installation work.

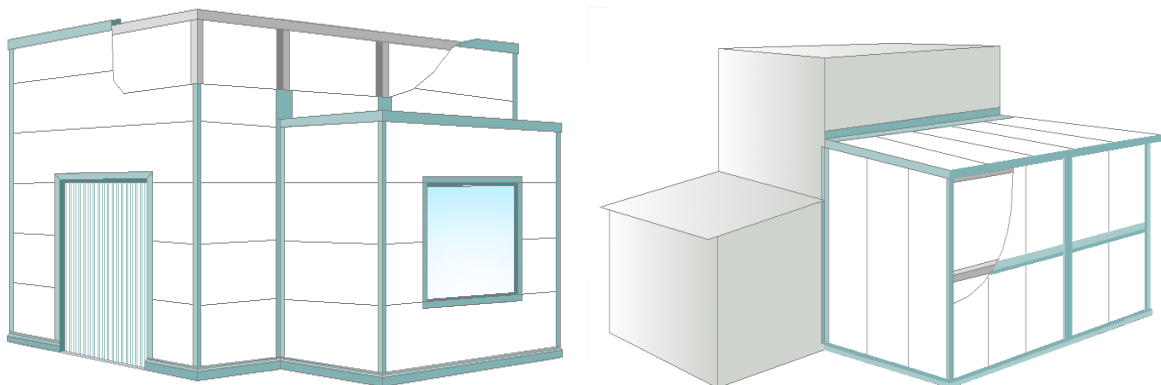


Figure 1. How to install sandwich panels horizontally and vertically.

Reasonable design and technological solutions are developed for the construction and installation of residential and industrial buildings from industrial sandwich panels. It is proposed to build from sandwich panels with reasonable technologies for the construction of residential and industrial buildings.



On this basis, in the technology of the complex process of assembling residential and industrial buildings from industrial sandwich panels, it is planned to develop a design model and structure and sequence of operations in accordance with the conditions of Uzbekistan. (Figure 2)[3]. From this algorithm, it can be concluded that industrial sandwich panels modeling method and then a new approach to the technology development for the construction of prefabricated residential and industrial buildings with a simplified method of "dry" assembly through multidimensional optimization of technological solutions is proposed.

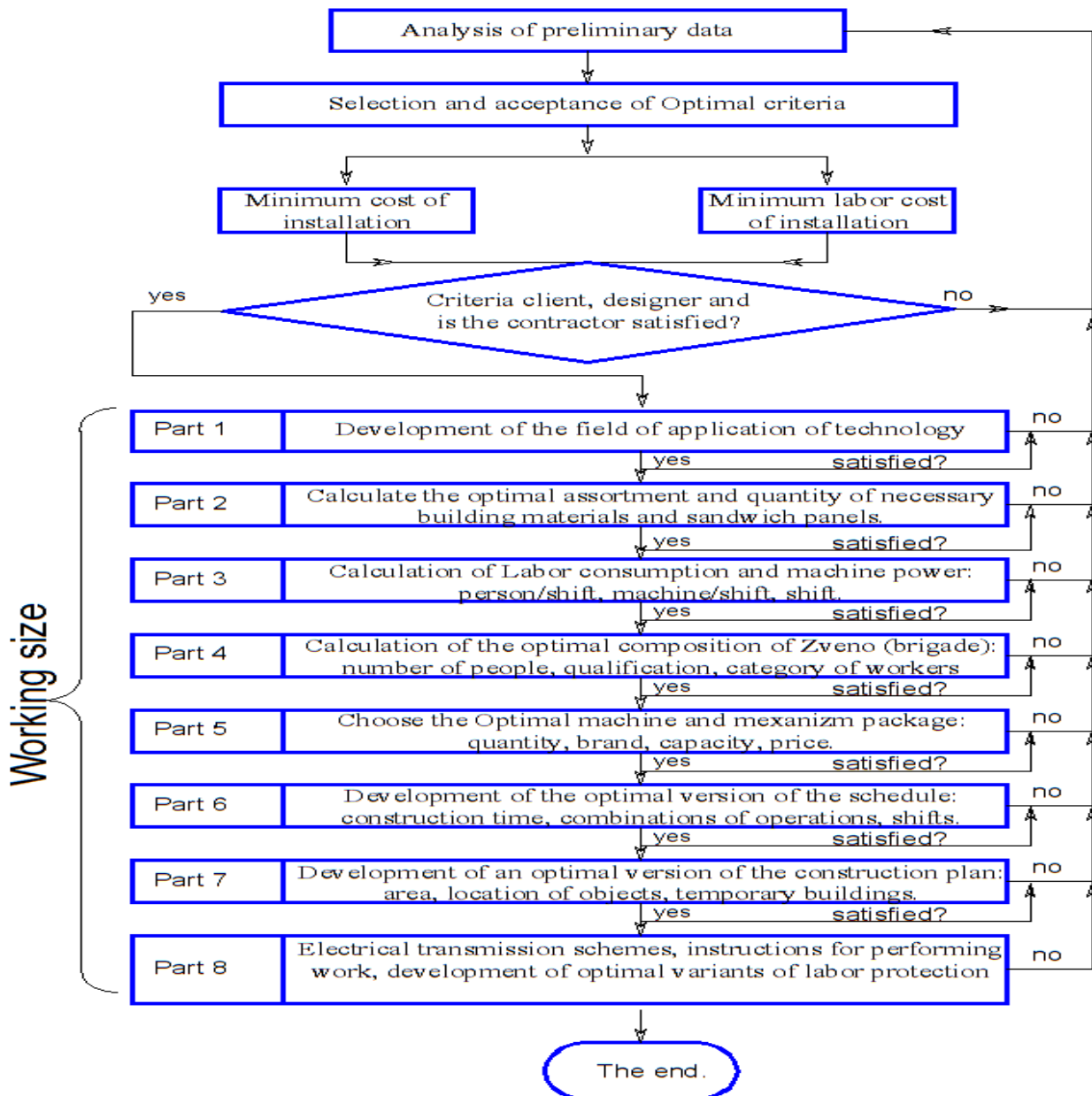


Figure 2. Algorithm for developing the optimal version of construction and installation technology.



High technical and economic efficiency of industrial sandwich panel production using improved rational solutions for residential and industrial buildings has been proven, and the cost of their installation has been significantly reduced 1 m². This process is much more efficient compared to the traditional methods that are currently available and comparable. We know that the algorithm for developing the optimal variant of the proposed construction and mounting technology, used above for the industrial and residential buildings installation, solves many problems in the installation process.

Conclusion

The research found that industrial buildings made of sandwich panels are more efficient in overall weight as well as seismic, and contribute to the strength of the building and rapid construction as soon as possible also ensures that the installation process does not take long. There are many types of sandwich panels available today and they can be easily used in construction and installation work. The mass of sandwich panels is also light and easy to install, providing a simple and convenient solution. This quality reduces construction cost and significantly reduces time.

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